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Self-Reported Health Symptoms and Conditions Among Complementary and Alternative Medicine Users in a Large Military Cohort

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PURPOSE: To describe medical symptom and condition reporting in relation to complementary and alternative medicine (CAM) use among members of the US military.

METHODS: CAM was defined as health treatments not widely taught at US medical schools or typically available at US hospitals. By using data from the Millennium Cohort Study, we included participants who completed a survey from 2004 to 2006 ($n = 86,131$) as part of this cross-sectional analysis in which we sought to identify demographic characteristics and types of health-related symptoms and conditions associated with CAM use. Chi-square tests were used to compare health assessed by self-reported symptoms and conditions among those not reporting CAM use with those reporting practitioner-assisted or self-administered CAM.

RESULTS: Of 86,131 participants, 30% reported using at least one practitioner-assisted CAM therapy, 27% reported using at least one self-administered CAM therapy, whereas 59% did not report using any CAM therapy. Both women and men who used CAM reported a greater proportion of specific health conditions and health-related symptoms compared with those not reporting CAM use ($p < 0.05$).

CONCLUSIONS: These findings illustrate that a relatively young adult occupational cohort of military personnel using CAM therapies also report multiple comorbidities which may indicate chronic illness management and poorer overall health.

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KEY WORDS: Cohort Studies, Complementary Therapies, Signs and Symptoms.

INTRODUCTION

Complementary and alternative medicine (CAM) is the collective term for treatments and therapies not routinely offered by mainstream medical practitioners, or widely taught at US medical schools (1). This definition encompasses a range of both provider- and practitioner-assisted therapies, from chiropractic procedures to nutritional supplement use.

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Current evidence suggests that CAM is widely accepted in the United States, with annual out-of-pocket expenditures estimated at \$27 billion in 1997 (2–4). CAM practices have been reported to be on the increase in the United States, with visits to alternative medicine practitioners increasing from 36.3% to 46.3% among adults from 1990 to 1997, surpassing visits to primary care physicians (5). Similar to these rates reported among US adults, CAM use among Navy and Marine Corps personnel was reported to be approximately 37% between 2000 and 2002 (6).

In an effort to characterize those who use CAM therapies, some studies have focused on identifying sociodemographic or social–psychologic correlates of those who chose CAM (7, 8). Other studies have focused on determining the primary health concerns of individuals who may use CAM therapies (9). These various studies have shown CAM use among the US adult population is most prevalent among Caucasian women, persons aged 35–54 years, persons with higher education, and persons of middle economic status (10). Results from a 2002 study found that CAM therapies were most often used for back pain or joint problems, upper respiratory colds, and anxiety or depression (4). Other research has also found greater CAM use correlated with the presence of specific health conditions (9, 11–15).

Selected Abbreviations and Acronyms

CAM = complementary and alternative medicine

A recent study found that individuals in poorer health and those suffering from mental, musculoskeletal, and metabolic disorders were more likely to report using CAM (16). A recent review of 110 published articles regarding CAM use suggested that its use increases with the number of chronic health conditions people report (17).

Little is known about CAM use in a relatively young, healthy, military occupational cohort. The objective of this study was to report characteristics of those reporting CAM use in a large population-based cohort and to compare a variety of self-reported health-related symptoms and conditions between those who report using CAM therapies with those who did not report using CAM therapies.

MATERIALS AND METHODS**Study Population and Data Sources**

The Millennium Cohort Study was launched in 2001, just before the start of the wars in Iraq and Afghanistan (18, 19). The primary goal of this prospective study is to evaluate any long-term health effects of military service. The Millennium Cohort Study consists of three panels enrolled at different times. Panel one was enrolled from July 2001 to June 2003, panel two was enrolled from June 2004 to February 2006, and panel three was enrolled from June 2007 to December 2008. Each panel is resurveyed every 3 years after enrollment through at least 2022.

For this study, data from panels one and two were used. Panel one participants were randomly selected from all US military personnel on rosters as of October 2000; they were oversampled from those who had been previously deployed, Reserve and National Guard (Reserve/Guard) members, and women to ensure sufficient statistical power to detect differences in these smaller subgroups of the population. Of the 214,388 personnel contacted for the first panel, 77,047 (36%) consented and were enrolled. Of the 77,047 enrolled in panel one, 55,021 (71%) submitted their first follow-up questionnaire from June 2004 to February 2006.

Personnel invited for panel two were randomly selected from individuals with 1–2 years of military service as of October 2003. Applying similar sampling methods used for panel one, except oversampling for Marines and women, 31,110 of the 123,001 (25%) contacted personnel consented and enrolled in panel two. Because the survey instrument was updated to include 12 measures of CAM for the first time during the 2004–2006 survey cycle, the population

for the current study consisted of 55,021 panel one individuals that submitted a follow-up survey, as well as 31,110 individuals who enrolled in panel two during the 2004–2006 survey cycle. The combination of panels one and two provided a sample size of 86,131 participants from all service branches, including both active duty and Reserve/National Guard members. This study protocol was approved by the institutional review board of the Naval Health Research Center, San Diego, California.

Demographic and Behavioral Characteristics

Demographic and military data were obtained from military electronic personnel files and included sex, birth date, race/ethnicity, education, marital status, branch of service (Army, Navy, Air Force, Marine Corps), service component (active duty or Reserve/Guard), military pay grade (enlisted or officer), and military occupation. Self-reported survey data were used to ascertain body mass index (underweight, healthy weight, overweight, obese), smoking status (nonsmoker, past smoker, current smoker), and alcohol-related problems (yes, no) from the Patient Health Questionnaire (20–22). Alcohol-related problems were defined as an endorsement of any of the following that occurred more than once during the past year: (i) drinking alcohol even after a doctor suggested stopping because of health problems; (ii) drinking or being high or hung over from alcohol while working, going to school, or taking care of children or other responsibilities; (iii) missing or being late for work, school, or other activities because of being drunk or hung over; (iv) having a problem getting along with people while drinking; and (v) driving a car after having several drinks or after drinking too much.

Symptoms and Medical Conditions Assessment

Thirty-eight specific health-related conditions were assessed using the question, “Has your doctor or other health professional ever told you that you have any of the following conditions?” Available response options included a variety of chronic and mental health conditions each listed in Table 1 (23). In addition, 28 common health symptoms were assessed using the question, “During the last 12 months, have you had persistent or recurring problems with any of the following conditions?” Available response options included various symptoms commonly related to chronic multi-symptom illness and are listed in Table 1.

CAM Assessment

Twelve questions were selected and included in the 2004–2006 Millennium Cohort survey instrument to assess CAM use. Although these questions were not intended to encompass the full spectrum of CAM possibilities, they were among the most commonly used interventions and

TABLE 1. Prevalence of self-reported health conditions and symptoms assessed on the Millennium Cohort Questionnaire (n = 86,131)

Health conditions	n (%)	Health symptoms	n (%)
Sinusitis	9479 (11.0)	Trouble sleeping	19302 (22.4)
Hypertension	8281 (9.6)	Severe headache	14366 (16.7)
Migraine headaches	8157 (9.5)	Forgetfulness	14001 (16.3)
Depression	7201 (8.4)	Pain in arms legs, or joints	12614 (14.6)
Significant hearing loss	5662 (6.6)	Sleepy all the time	12195 (14.1)
Bladder infection	4061 (4.7)	Unusual fatigue	11892 (13.8)
Asthma	3430 (4.0)	Menstrual cramps	3444 (12.9)
Other heart conditions	2771 (3.2)	Back pain	11034 (12.8)
Anemia	2707 (3.1)	Cough	9707 (11.3)
Sleep apnea	2614 (3.0)	Diarrhea	8685 (10.1)
Posttraumatic stress disorder	2018 (2.3)	Sore throat	8324 (9.7)
Chronic bronchitis	1988 (2.3)	Unusual muscle pain	7859 (9.1)
Angina (chest pain)	1826 (2.1)	Night sweats	7079 (8.2)
Thyroid condition other than cancer	1737 (2.0)	Shortness of breath	6923 (8.0)
Stomach, duodenal, peptic ulcer	1695 (2.0)	Rash or skin ulcer	5993 (7.0)
Rheumatoid arthritis	1581 (1.8)		
Neuropathy-caused reduced sensation	1503 (1.7)	Chest pain	5436 (6.3)
Cancer	1333 (1.5)	Nausea, gas, or indigestion	4354 (5.1)
Gallstones	987 (1.1)	Confusion	4271 (5.0)
Diabetes or sugar diabetes	916 (1.1)	Constipation, loose bowel or diarrhea	3653 (4.2)
Chronic fatigue syndrome	909 (1.1)	Fever	3615 (4.2)
Manic-depressive disorder	571 (0.7)	Sudden unexplained hair loss	2273 (2.6)
Coronary heart disease	494 (0.6)	Stomach pain	2272 (2.6)
Seizures	400 (0.5)	Frequent bladder infections	1632 (1.9)
Ulcerative colitis or proctitis	387 (0.4)	Pain during sexual intercourse	1520 (1.8)
Any other hepatitis	379 (0.4)	Feeling your heart pound or race	1419 (1.6)
Heart attack	367 (0.4)	Earlobe pain	1203 (1.4)
Hepatitis B	347 (0.4)	Dizziness	917 (1.1)
Hepatitis C	281 (0.3)	Fainting spells	149 (0.2)
Pancreatitis	217 (0.2)		
Emphysema	214 (0.2)		
Stroke	199 (0.2)		
Schizophrenia or psychosis	194 (0.2)		
Multiple sclerosis	188 (0.2)		
Lupus	178 (0.2)		
Crohn's disease	165 (0.2)		
Cirrhosis	127 (0.2)		
Kidney failure requiring dialysis	109 (0.1)		

included those items believed to make a clearer distinction between CAM and conventional medicine (1, 5, 9, 10). The survey asked, “Other than conventional medicine, what other health treatments have you used in the last 12 months?” with the following options available as a yes/no response: acupuncture, biofeedback, chiropractic care, energy healing, folk remedies, herbal therapy, high dose/ megavitamin therapy, homeopathy, hypnosis, massage, relaxation, and spiritual healing. No explanatory information was provided to aid in the completion of these questions. The 12 CAM therapies were later grouped during analyses into either practitioner-assisted or self-administered therapies based on groupings identified by the National Center for CAM (24). Acupuncture, biofeedback, chiropractic care, energy healing, folk medicine, hypnosis, and massage were grouped together as practitioner-assisted CAM therapies, whereas herbal therapy, high dose/

megavitamin therapy, homeopathy, relaxation, and spiritual healing were grouped together as self-administered CAM therapies.

Statistical Analysis

The aim of this exploratory analysis was to describe self-reported symptoms and conditions associated with self-reported CAM use. Descriptive analyses were performed to determine demographic characteristics associated with CAM use for the entire study population. Proportional differences were considered statistically significant at $p < 0.05$. In addition, the frequencies of 38 specific self-reported health conditions and 28 health-related symptoms were investigated after stratifying by sex. Among men and women, chi-square tests were used to evaluate differences in reported CAM use

TABLE 2. Characteristics of 2004–2006 Millennium Cohort participants by CAM use (n = 86,131)

Characteristic	Self-reported CAM use ^a		
	None n = 51,131 n (%) ^c	Practitioner-assisted ^b n = 26,056 n (%) ^c	Self-administered ^b n = 23,376 n (%) ^c
Sex			
Male	38,304 (74.9)	15,360 (58.9)	13,773 (58.9)
Female	12,827 (25.1)	10,696 (41.1)	9,603 (41.1)
Birth year			
Pre-1960	8,259 (16.1)	3,714 (14.2)	3,724 (15.9)
1960–1969	14,642 (28.6)	6,861 (26.3)	5,974 (25.6)
1970–1979	15,760 (30.8)	8,502 (32.6)	7,318 (31.3)
1980 and beyond	12,470 (24.4)	6,979 (26.8)	6,360 (27.2)
Race/ethnicity			
White, non-Hispanic	36,835 (72.0)	18,506 (71.0)	15,482 (66.2)
Black, non-Hispanic	5,682 (11.1)	2,963 (11.4)	3,764 (16.1)
Other	8,562 (16.7)	4,547 (17.5)	4,100 (17.5)
Missing data	52 (0.1)	40 (0.2)	30 (0.1)
Education			
High school diploma or less	30,174 (59.0)	15,043 (57.7)	13,894 (59.4)
Some college	6,378 (12.5)	3,135 (12.0)	2,989 (12.8)
Bachelors	9,364 (18.3)	5,093 (19.6)	4,107 (17.6)
Graduate school	5,208 (10.2)	2,778 (10.7)	2,383 (10.2)
Missing data	7 (0.0)	7 (0.0)	3 (0.0)
Marital status			
Never married	17,689 (34.6)	1,0439 (40.1)	9,374 (40.1)
Married	30,420 (59.5)	13,600 (52.2)	12,107 (51.8)
Divorced, widowed, separated	3,022 (5.9)	2,017 (7.7)	1,895 (8.1)
Military pay grade			
Officer	11,584 (22.7)	6,243 (24.0)	4,930 (21.1)
Enlisted	39,547 (77.3)	19,813 (76.0)	18,446 (78.9)
Service branch			
Army	24,144 (47.2)	12,622 (48.4)	11,568 (49.5)
Navy and Coast Guard	8,771 (17.1)	4,767 (18.3)	4,466 (19.1)
Marine Corps	2,861 (5.6)	1,510 (5.8)	1,212 (5.2)
Air Force	15,355 (30.0)	7,157 (27.5)	6,130 (26.2)
Service component			
Reserve/National Guard	24,149 (47.2)	13,339 (51.2)	11,381 (48.7)
Active duty	26,982 (52.8)	12,717 (48.8)	11,995 (51.3)
Military occupation			
Combat specialists	9,675 (18.9)	4,343 (16.7)	3,638 (15.6)
Electronic equipment repair	4,832 (9.4)	2,071 (7.9)	1,830 (7.8)
Communications/intelligence	4,031 (7.9)	2,220 (8.5)	1,987 (8.5)
Health care	4,975 (9.7)	3,635 (13.9)	3,545 (15.2)
Other technical and allied	1,370 (2.7)	693 (2.7)	618 (2.6)
Functional support and admin	10,212 (20.0)	5,571 (21.4)	5,095 (21.8)
Electrical/mechanical equip. repair	7,428 (14.5)	2,966 (11.4)	2,752 (11.8)
Craft workers	1,608 (3.1)	773 (3.0)	663 (2.8)
Service and supply	5,149 (10.1)	2,737 (10.5)	2,380 (10.2)
Students, trainees, and other	1,840 (3.6)	1,044 (4.0)	865 (3.7)
Missing	11 (0.0)	3 (0.0)	3 (0.0)
Body mass index			
Underweight	369 (0.7)	206 (0.8)	200 (0.9)
Healthy weight	17,345 (33.9)	10,036 (38.5)	8,955 (38.3)
Overweight	23,513 (46.0)	11,303 (43.4)	10,167 (43.5)
Obese	6,774 (13.2)	3,247 (12.5)	3,008 (12.9)
Missing data	3,130 (6.1)	1,264 (4.9)	1,046 (4.5)
Smoking status			
Nonsmoker	28,530 (55.8)	14,573 (55.9)	12,719 (54.4)
Past smoker	7,157 (14.0)	3,566 (13.7)	3,371 (14.4)
Current smoker	13,570 (26.5)	7,250 (27.8)	6,658 (28.5)
Missing data	1,874 (3.7)	667 (2.6)	628 (2.7)

(Continued)

TABLE 2. (Continued)

Characteristic	Self-reported CAM use ^a		
	None n = 51,131 n (%) ^c	Practitioner-assisted ^b n = 26,056 n (%) ^c	Self-administered ^b n = 23,376 n (%) ^c
Alcohol-related problems ^d			
No	46,407 (90.8)	22,974 (88.2)	20,597 (88.1)
Yes	4,724 (9.2)	3,082 (11.8)	2,779 (11.9)

^aAll unadjusted associations between practitioner-assisted CAM use and no CAM use as well as self-administered CAM and no CAM use by individual characteristics were statistically significant ($p < 0.05$), except that self-administered CAM use compared with no CAM use did not differ by education.

^bPractitioner-assisted complementary and alternative medicine (CAM) therapies include acupuncture, biofeedback, chiropractic care, energy healing, folk remedies, hypnosis, and massage. Self-administered CAM therapies include herbal therapy, high dose/megavitamin therapy, homeopathy, relaxation, and spiritual healing. These two categories are not mutually exclusive.

^cPercents may not sum to 100 due to rounding.

^dAlcohol-related problems were defined by endorsement of any of the following that occurred more than once during the past year: (a) you drank alcohol even after a doctor suggested stopping due to health problems; (b) you drank alcohol, were high from alcohol, or were hung over while you were working, going to school, or taking care of children or other responsibilities; (c) you missed or were late for work, school, or other activities because you were drinking or hung over; (d) you had a problem getting along with people while you were drinking; (e) you drove a car after having several drinks or after drinking too much.

by health-related symptom or condition. Statistical analyses were performed using SAS, version 9.1 (SAS Institute Inc., Cary, NC).

RESULTS

Of 86,131 cohort members included in this study, 41% ($n = 35,000$) reported using any of the 12 CAM therapies, 30% ($n = 26,056$) reported using at least one practitioner-assisted CAM therapy, 27% ($n = 23,376$) reported using at least one self-administered CAM therapy, whereas 59% ($n = 51,131$) did not report using any CAM therapy within the last 12 months. A greater proportion of women reported using either type of CAM therapy compared with men. The frequency of the 12 CAM therapies reported by both men and women from highest to lowest were as follows: massage therapy (24.8%), relaxation therapy (20.1%), chiropractic care (10.5%), spiritual healing (9.4%), herbal therapy (7.7%), high dose/megavitamin therapy (3.7%), folk remedies (2.1%), homeopathy (1.6%), energy healing (1.4%), acupuncture (1.4%), biofeedback (0.6%), and hypnosis (0.5%; data not shown).

Table 2 provides a comparison between “practitioner-assisted CAM use” with “no CAM use” as well as “self-administered CAM use” with “no CAM use.” Because practitioner-assisted and self-administered CAM use categories are not mutually exclusive, statistical comparisons between these groups were not made. Compared with those who did not report CAM use, reporting of practitioner-assisted CAM therapies was proportionately greater among the following subgroups: women, younger persons, those other than white non-Hispanic race, more educated persons, those who were never married or divorced, officers, those serving in the Army or Navy, members of the Reserve/Guard, healthcare workers, healthy-weight individuals, current smokers, and those who reported

alcohol-related problems. These same subgroups were also proportionately greater in reporting of self-administered CAM therapies when compared with those reporting no CAM use, except that those reporting self-administered CAM use were more likely to be enlisted personnel and did not differ by education level.

The numbers of self-reported health conditions and symptoms by practitioner-assisted and self-administered CAM use are provided in Table 3. Overall, a greater proportion of those reporting both practitioner-assisted and self-administered CAM use also reported more health

TABLE 3. Number of reported health conditions and symptoms by CAM use, both genders

	No CAM use, n = 51,131	Practitioner-assisted CAM use, ^a n = 26,056	Self-administered CAM use, ^b n = 23,376
Reported health conditions, n (%) ^c			
None	30,778 (60.2)	12,438 (47.7)	10,627 (45.5)
1	11,067 (21.6)	6,045 (23.2)	5,371 (23.0)
2	4,896 (9.6)	3,417 (13.1)	3,148 (13.5)
3	2,216 (4.3)	1,843 (7.1)	1,869 (8.0)
4	1,006 (2.0)	996 (3.8)	995 (4.3)
5	542 (1.1)	582 (2.2)	583 (2.5)
6–10	542 (1.1)	673 (2.6)	714 (3.0)
> 10	84 (0.2)	62 (0.2)	69 (0.2)
Reported health symptoms, n (%) ^c			
None	26,005 (50.9)	9,081 (34.8)	7,889 (33.7)
1	7,728 (15.1)	3,979 (15.3)	3,422 (14.6)
2	4,707 (9.2)	2,876 (11.0)	2,445 (10.5)
3	3,256 (6.4)	1,981 (7.6)	1,806 (7.7)
4	2,303 (4.5)	1,701 (6.5)	1,564 (6.7)
5	1,700 (3.3)	1,318 (5.1)	1,207 (5.2)
6–10	4,047 (7.9)	3,546 (13.6)	3,434 (14.7)
> 10	1,385 (2.7)	1,574 (6.1)	1,609 (6.9)

^aAcupuncture, biofeedback, chiropractic care, energy healing, folk remedies, hypnosis, massage.

^bHerbal therapy, high dose/megavitamin therapy, homeopathy, relaxation, spiritual healing.

^cPercents may not sum to 100 due to rounding.

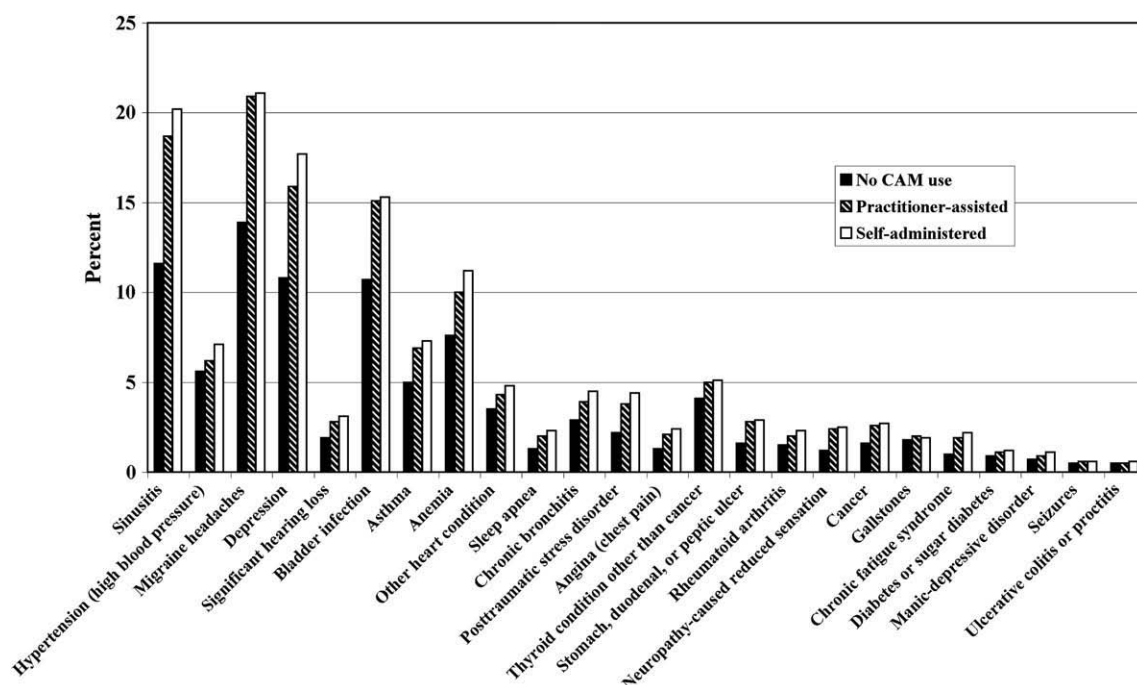


FIGURE 1. Percentage of self-reported health conditions by CAM use status among female members of the Millennium Cohort Study submitting a survey between 2004–2006 ($n = 33,126$). The following conditions were omitted from this graph because they were reported by less than 0.5% of the population: Coronary heart disease, hepatitis B, hepatitis C, any other hepatitis, heart attack, pancreatitis, lupus, multiple sclerosis, emphysema, Crohn's disease, stroke, schizophrenia or psychosis, kidney failure requiring dialysis, and cirrhosis.

conditions than those not reporting CAM use, and the percentage of those reporting practitioner-assisted CAM use and self-administered CAM use was similar by number of reported health conditions. Reporting of multiple symptoms was much greater among those reporting either type of CAM use. Most notably, reporting > 10 symptoms was more than twice as high among those using CAM. Consistent with condition reporting, the number of health-related symptoms indicated was similar between those reporting practitioner-assisted and self-administered CAM use.

Women and men who reported either practitioner-assisted or self-administered CAM use were more likely to report approximately half of the health-related conditions (Figs. 1 and 2). Conditions more likely to be reported by women using either type of CAM therapy compared with those not using any CAM were sinusitis, hypertension, migraine headaches, depression, significant hearing loss, bladder infection, asthma, anemia, other heart conditions, sleep apnea, chronic bronchitis, posttraumatic stress disorder, angina, thyroid condition other than cancer, rheumatoid arthritis, neuropathy-caused reduced sensation, cancer, chronic fatigue syndrome, manic-depressive disorder, and stomach, duodenal, or peptic ulcer ($p < 0.05$; Fig. 1). Women using self-administered CAM reported more of these conditions than women using practitioner-assisted CAM (Fig. 1). Conditions reported by a larger proportion of men using

either type of CAM therapy compared with those not using any CAM were the same as women (Fig. 2). Greater frequencies were also seen in men who reported self-administered compared with practitioner-assisted CAM use (Fig. 2).

Both women and men reporting either type of CAM were significantly more likely than women and men not using any CAM to report all of the symptoms evaluated except for fainting spells ($p < 0.05$; Figs. 3 and 4). Most symptoms were also reported more frequently by women using self-administered therapies, except for back pain, which was reported more by those using practitioner-assisted therapies (Fig. 3). Among men, only two of the reported symptoms, pain in arms, legs, or joints and back pain, were more frequently reported by those using practitioner-assisted CAM therapies rather than self-administered CAM therapies (Fig. 4).

When asked about overall general health (data not shown), more women who reported at least one CAM therapy rated their overall health as "fair or poor" than women who did not use CAM (5.7% vs. 4.7%). Additionally, only 27.1% of women who reported the use of CAM also reported excellent or very good health compared with 37.5% of women who did not report use of CAM. Men showed similar patterns, with 5.5% of men who used at least one CAM therapy reporting "fair or poor" health compared with 3.7% of men who did not use CAM, and 27.2% of men

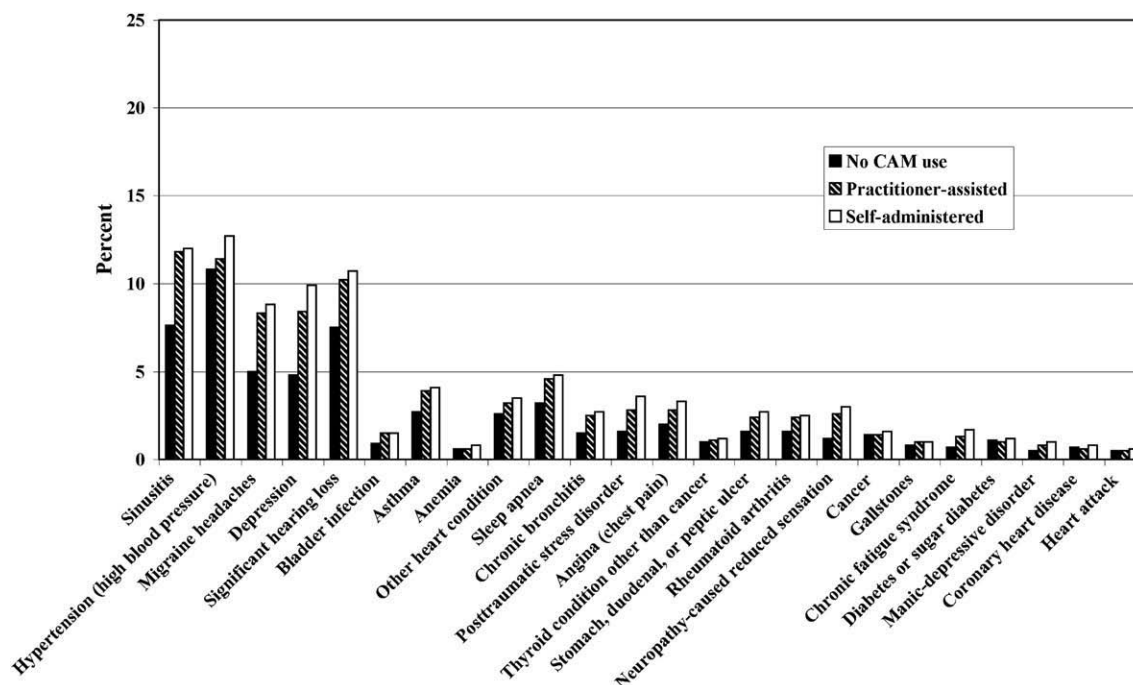


FIGURE 2. Percentage of self-reported health conditions by CAM use status among male members of the Millennium Cohort Study submitting a survey between 2004–2006 ($n = 67,437$). The following conditions were omitted from this graph because they were reported by less than 0.5% of the population: seizures, hepatitis B, hepatitis C, any other hepatitis, ulcerative colitis, pancreatitis, lupus, multiple sclerosis, emphysema, Crohn's disease, stroke, schizophrenia or psychosis, kidney failure requiring dialysis, and cirrhosis.

who used CAM reporting “excellent or very good” health compared with 29.6% of men who did not use CAM.

DISCUSSION

As the use of CAM therapies continues to increase, it is important for military health-care providers to understand the demographic and health characteristics of those who use CAM in military and veteran populations. In this study, the demographic characteristics of those reporting both practitioner-assisted and self-administered CAM use were female gender, born in 1970 and later, divorced/widowed/separated, employed in the health care field, and having a greater prevalence of alcohol-related problems. Although past literature suggests increased use of CAM is subsequent to illness onset (11, 12, 25), this link has not been established in a relatively young, healthy, adult population with a presumed lower prevalence of chronic illness. In this cross-sectional study, we found that individuals who reported the use of one or more CAM therapies in the previous 12 months were more likely to also report a broad range of symptom and conditions compared with individuals who did not report CAM use.

This study highlights a greater likelihood of symptom and condition reporting among those who report either practitioner-assisted or self-administered CAM use when

compared with those who do not. This is an interesting finding given the diversity of the health conditions and symptoms assessed, indicating the wide array of morbidities that may be associated with CAM use. These findings are consistent with civilian populations in that CAM therapies may be used for chronic disease management in this population. Recent studies have shown that individuals who use CAM are also greater users of conventional care (26), which suggests that CAM may also be used as an adjunct to allopathic therapies to treat clinical symptoms. In addition, two recent studies have concluded that American, Canadian, and English persons who use CAM have poorer physical health in general than persons who do not use CAM (27, 28). Our study supports these findings in that those who report CAM use generally report a greater number of health-related conditions than those who do not use CAM, while also endorsing a lower perceived health status.

We also investigated whether individuals who reported CAM use were also more likely to report a greater number of medical conditions and symptoms compared with individuals who did not report CAM use. Cohort members reporting practitioner-assisted and self-administered CAM use also reported more health-related symptoms and conditions than individuals who did not report CAM use, indicating a greater likelihood to report more overall illness,

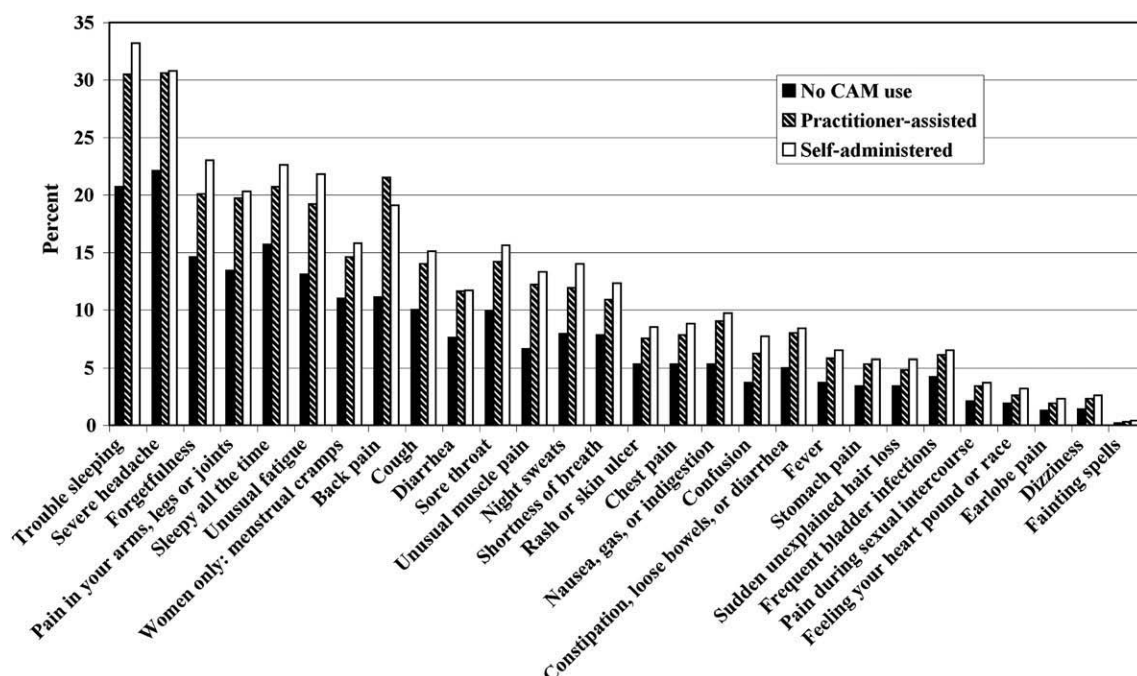


FIGURE 3. Percentage of self-reported health symptoms by CAM use status among female members of the Millennium Cohort Study submitting a survey between 2004–2006 ($n = 33,126$).

as well as individual symptoms and conditions. It is interesting to note that those reporting either type of CAM use endorsed many more health-related symptoms than physician diagnoses (health conditions). A recent study investigating CAM use and subsequent hospitalizations showed that a greater proportion of CAM users had little to no satisfaction with their conventional medical doctor compared with those who did not use CAM (29). Although our study did not measure attitudes toward medical providers among CAM users, future studies should be designed to specifically assess reasons for using CAM and whether dissatisfaction with conventional medical care is associated with increased CAM use.

This study has some important limitations that should be noted. First, we assessed 12 CAM therapies, which do not account for the entire spectrum of possible CAM therapies (24). In addition, the temporal association between symptom and condition reporting and CAM use cannot be established from this cross-sectional investigation. Also, no specific information on the dosage or frequency of CAM use was available from the survey, nor were we able to ascertain the reasons why an individual may have chosen a specific CAM therapy or whether the therapy was actually administered by a provider or not. Furthermore, the CAM therapies available for response were listed without a full description of the therapy, leaving the meaning of the response options open to the interpretation of the study participant, which may have lead to some

misclassification of CAM use. Finally, access to the military health care system is different for active duty compared with Reserve/National Guard personnel and those separated from military service, so differential access to health care could potentially play a role in an individual's decision to use CAM therapies, which we could not measure in this study.

This is the first, large-scale epidemiologic research study of both active duty and Reserve/Guard personnel from all branches of military service to investigate 12 frequently used CAM therapies in the context of health-related symptom and condition reporting. Additionally, the large sample size of both men and women in this population-based cohort allowed for robust comparisons between those who use CAM and those who do not.

In conclusion, these cross-sectional data suggest that self-reported CAM use is statistically associated with symptom and condition reporting that may be consistent with chronic illness management and poorer overall health in a relatively young, healthy, adult working military population. Whether this association applies to all CAM users is not known. The greater use of CAM among healthy-weight individuals suggests that health-minded individuals may use it for possible health benefits. Follow-up studies that include a temporal component will allow us to better understand whether CAM use is associated with poorer or better self-reported health and with a decline or increase in symptom and condition

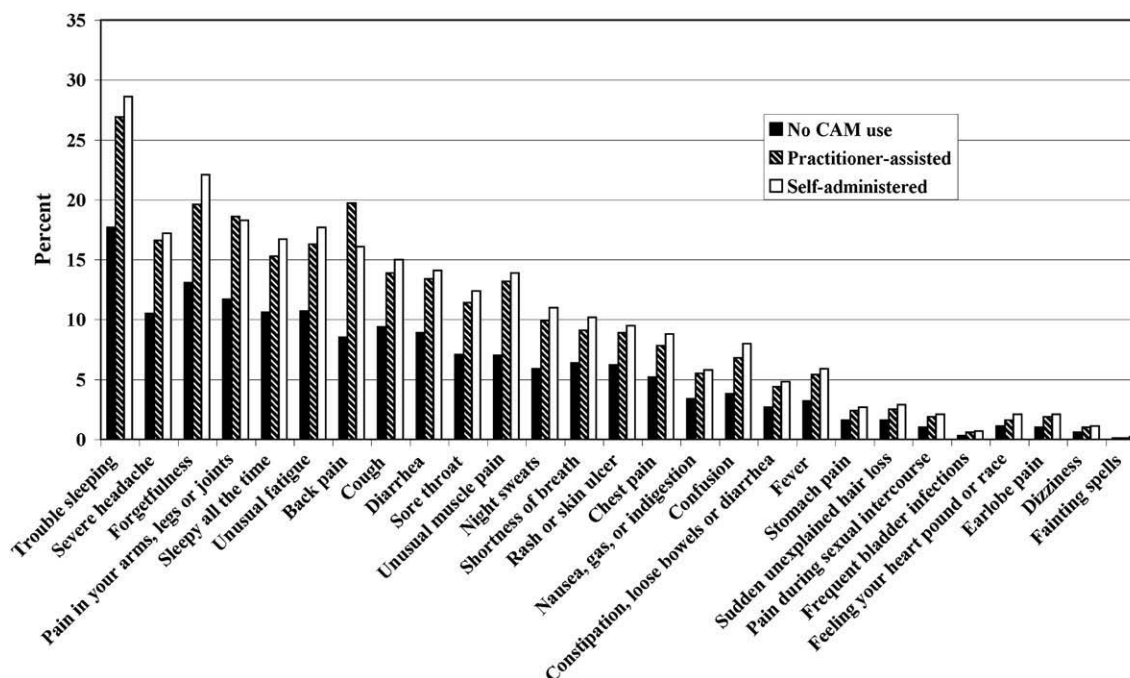


FIGURE 4. Percentage of self-reported health symptoms by CAM use status among male members of the Millennium Cohort Study submitting a survey between 2004–2006 ($n = 67,437$).

reporting. The Millennium Cohort Study is positioned to longitudinally assess these questions in a large population of relatively young individuals as they age.

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REFERENCES

- Eisenberg DM, Kessler RC, Foster C, Norlock FE, Calkins DR, Delbanco TL. Unconventional medicine in the United States. Prevalence, costs, and patterns of use. *N Engl J Med*. 1993;328:246–252.
- Ernst E. Prevalence of use of complementary/alternative medicine: A systematic review. *Bull World Health Organ*. 2000;78:252–257.
- Harris P, Rees R. The prevalence of complementary and alternative medicine use among the general population: A systematic review of the literature. *Complement Ther Med*. 2000;8:88–96.
- Barnes PM, Powell-Griner E, McFann K, Nahin RL. Complementary and alternative medicine use among adults: United States, 2002. *Adv Data*. 2004;1–19.
- Eisenberg DM, Davis RB, Ettner SL, Appel S, Wilkey S, Van Rompay M, et al. Trends in alternative medicine use in the United States, 1990–1997: Results of a follow-up national survey. *JAMA*. 1998;280:1569–1575.
- Smith TC, Ryan MA, Smith B, Reed RJ, Riddle JR, Gumbs GR, et al. Complementary and alternative medicine use among US Navy and Marine Corps personnel [electronic article] *BMC Complement Altern Med*. 2007;7:16.
- Stratton TD, McGivern-Snofsky JL. Toward a sociological understanding of complementary and alternative medicine use. *J Altern Complement Med*. 2008;14:777–783.
- Cauffman JS. The psychosocial aspects of complementary and alternative medicine. *Pharmacotherapy*. 2000;20:1289–1294.
- Astin JA. Why patients use alternative medicine: Results of a national study. *JAMA*. 1998;279:1548–1553.
- Ni H, Simile C, Hardy AM. Utilization of complementary and alternative medicine by United States adults: results from the 1999 National Health Interview Survey. *Med Care*. 2002;40:353–258.
- Ernst E. The role of complementary and alternative medicine in cancer. *Lancet Oncol*. 2000;1:176–180.
- Graham DM, Blaiss MS. Complementary/alternative medicine in the treatment of asthma. *Ann Allergy Asthma Immunol*. 2000;85:438–447 quiz 47–9.
- Rossi P, Torelli P, Di Lorenzo C, Sances G, Manzoni GC, Tassorelli C, et al. Use of complementary and alternative medicine by patients with

- cluster headache: Results of a multi-centre headache clinic survey. *Complement Ther Med*. 2008;16:220–227.
14. Sirois FM. Provider-based complementary and alternative medicine use among three chronic illness groups: Associations with psychosocial factors and concurrent use of conventional health-care services. *Complement Ther Med*. 2008;16:73–80.
15. Chenot JF, Becker A, Leonhardt C, Keller S, Donner-Banzhoff N, Baum E, et al. Use of complementary alternative medicine for low back pain consulting in general practice: A cohort study [electronic article] *BMC Complement Altern Med*. 2007;7:42.
16. Bausell RB, Lee WL, Berman BM. Demographic and health-related correlates to visits to complementary and alternative medical providers. *Med Care*. 2001;39:190–196.
17. Bishop FL, Yardley L, Lewith GT. A systematic review of beliefs involved in the use of complementary and alternative medicine. *J Health Psychol*. 2007;12:851–867.
18. Gray GC, Chesbrough KB, Ryan MA, Amoroso PJ, Boyko EJ, Gackstetter GD, et al. The Millennium Cohort Study: a 21-year prospective cohort study of 140,000 military personnel. *Mil Med*. 2002;167:483–488.
19. Ryan MA, Smith TC, Smith B, Amoroso PJ, Boyko EJ, Gray GC, et al. Millennium Cohort: Enrollment begins a 21-year contribution to understanding the impact of military service. *J Clin Epidemiol*. 2007;60:181–191.
20. Spitzer RL, Kroenke K, Williams JB. Validation and utility of a self-report version of PRIME-MD: the PHQ primary care study. *Primary Care Evaluation of Mental Disorders. Patient Health Questionnaire*. *JAMA*. 1999;282:1737–1744.
21. Spitzer RL, Williams JB, Kroenke K, Hornyak R, McMurray J. Validity and utility of the PRIME-MD patient health questionnaire in assessment of 3000 obstetric-gynecologic patients: The PRIME-MD Patient Health Questionnaire Obstetrics-Gynecology Study. *Am J Obstet Gynecol*. 2000;183:759–769.
22. Spitzer RL, Williams JB, Kroenke K, Linzer M, deGruy FV 3rd, Hahn SR, et al. Utility of a new procedure for diagnosing mental disorders in primary care. The PRIME-MD 1000 study. *JAMA*. 1994;272:1749–1756.
23. Smith B, Chu LK, Smith TC, Amoroso PJ, Boyko EJ, Hooper TI, et al. Challenges of self-reported medical conditions and electronic medical records among members of a large military cohort [electronic article] *BMC Med Res Methodol*. 2008;8:37.
24. National Center for Complementary and Alternative Medicine. The Use of CAM in the United States. Available at: <http://nccam.nih.gov/news/camuse.pdf>. Accessed September 25, 2008.
25. Ernst E. Complementary and alternative medicine in rheumatology. *Baillieres Best Pract Res Clin Rheumatol*. 2000;14:731–749.
26. Grzywacz JG, Quandt SA, Neiberg R, Lang W, Bell RA, Arcury TA. Age-related differences in the conventional health care—complementary and alternative medicine link. *Am J Health Behav*. 2008;32:650–663.
27. Ong CK, Petersen S, Bodeker GC, Stewart-Brown S. Health status of people using complementary and alternative medical practitioner services in 4 English counties. *Am J Public Health*. 2002;92:1653–1656.
28. McFarland B, Bigelow D, Zani B, Newsom J, Kaplan M. Complementary and alternative medicine use in Canada and the United States. *Am J Public Health*. 2002;92:1616–1618.
29. Smith TC, Smith B, Ryan MA. Prospective investigation of complementary and alternative medicine use and subsequent hospitalizations. *BMC Complement Altern Med*. 2008;8:19.

REPORT DOCUMENTATION PAGE

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14. ABSTRACT <p>Background: A typical profile of a person in the military who chooses complementary and alternative medicine (CAM) has not yet been established. Using data from the Millennium Cohort Study, this cross-sectional analysis identified demographic characteristics and types of health-related symptoms and conditions associated with CAM use.</p> <p>Methods: A cross-sectional analysis of 86,131 individuals from all services, as well as active duty and Reserve and National Guard members from the Millennium Cohort, participated in this study. This exploratory analysis sought to describe self-reported health-related symptoms and conditions associated with reported CAM use.</p> <p>Results: This study highlights a consistent increase in symptom and condition reporting among those who report either practitioner-assisted or self-administered CAM use compared with those who do not. This is an interesting finding given the diversity of health conditions and symptoms assessed, indicating a wide array of morbidities that CAM may be used to treat.</p> <p>Conclusion: With increased use of CAM therapies in US civilian and military personnel, it is important for military health care providers to understand the characteristics of CAM use in these populations.</p>					
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